A CASE OF RUPTURED KIDNEY FROM A RAILROAD ACCIDENT, WITH REMARKS.[1]

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THE following case is of peculiar interest, as the injury is one very frequently produced by railroads, and very fatal in its consequences.

On January 27, 1891, I was called to Oil City, Pa, by a dispatch, stating that a man had been severely injured by a railroad accident, and that probably a laparotomy would have to be performed. On arriving, late in the evening, I saw the patient, Mr. A. Wood, æt. 22, and learned from his attending surgeons the following history:

Late in the evening on January 23, four days previously, he was caught obliquely between the bumpers while coupling cars. He stated then that he was not seriously hurt, and could continue work as brakeman on a freight train. He actually did ride 30 miles on the train, but then had to give up on account of faintness, pain and vomiting, and was brought back to Oil City, where Dr Coulter was called to see him on January 24, at 3:30 A M. He found no visible injury, no fracture of pelvic bones, no particular tenderness in abdomen, except in right iliac region, where he had considerable pain by pressure. No ecchymoses were present anywhere. At this time he was not considered seriously hurt. During the day (January 24) the patient could not urinate, and was in great distress on that account. He managed at last to empty his bladder, and the water contained a great amount of blood. After that his bladder was emptied with a catheter three or four times a day, and the urine continued to contain more or less blood.

On January 24 the temperature began to rise, being 102.5°, but afterward gradually receded to 100.5°. The pulse ranged from 100 to 108. On the same day tympanitis commenced, although not exces-

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sive. Some flatus were passed on January 29. No hiccough. On examination the patient was seen to be a strong healthy young man. Temperature, 102°; pulse, 108, full and regular.

Considerable meteorismus was present, with tenderness in right iliac region. No particular tenderness in left side of the abdomen. The meteorismus prevented a careful examination of the abdomen. Over the right lumbar region a diffuse echymosis and some fullness and muscular rigidity were seen, and he was very tender upon deep pressure here. There was slight ecchymosis around anus and in perineum.

The urine was normal in quantity, but intimately mixed with blood, and of a dark, dirty color. It contained no coagula of blood. His bowels had not moved, he having been kept under the influence of opium since the injury.

The question of diagnosis was first discussed. It was evident that the man was seriously hurt, but I thought we could exclude any injury to organs in the abdominal cavity. A crush or rupture of the bowels would probably have terminated fatally before that time by diffuse peritonitis, of which there were no signs. True enough, he had considerable meteorismus, but not more than could be accounted for by a slight traumatic peritonitis and the continued opium-treatment. The normal quantity of urine, of course, excluded rupture of the bladder, not to mention the absence of diffuse peritonitis. A rupture of spleen or liver would probably have terminated fatally by internal hæmorrhage in a short time.

The ecchymosis over the right lumbar region, on the other hand, the deep-seated pain and swelling here. the muscular rigidity, the intimate mixture of the urine with blood, the fact that he vomited immediately after the accident, but else was able to travel 30 miles and then first became faint and had to give up work, and lastly the tenesmus of the bladder, pointed directly to the right kidney as the seat of lesion, and I thought I was justified in diagnosing a rupture of this organ.

The next question, whether he could be removed to Buffalo, as his family insisted upon, was settled with the diagnosis, and Dr. Coulter and I left the same night with the patient on a special train, and arrived in Buffalo at 6 o'clock on the morning of January 28, the patient having stood the journey well. I had him transferred to the Emergency Hospital, and gave the order to have him take ℥j of epsom salt immediately, and ℥ss every hour afterward till copious evacuations occurred, and to have him transferred to the Sisters' Hospital for operation at 11 o'clock. On his arrival there he had had several copious

evacuations, with the result that the meteorismus had disappeared. An indistinct deep swelling, with intense tenderness by pressure, could now be felt in the right iliac region. Under ether narcosis exploratory incision of the right kidney was made in the usual way by an incision four inches long and two and one half inches from the spine, extending from twelfth rib downward toward spina ilei posterior superior. Having reached the lumbar fascia, the usual yellowish white color was seen changed to an intense dark color from infiltration of blood. On passing through this fascia a large cavity was opened, containing about a pint of dark bloody fluid and coagula. The lower half of the kidney was found crushed to a pulp, and in feeling very much resembling that of an epithelioma of the uterus in the process of disintegration.

The question of nephrectomy was now in order, but bleeding from the crushed kidney was so copious by the slightest touch or manipulation, that all I could do was quickly to remove the blood coagula, disinfect the cavity with corrosive sublimate, and then pack it firmly with iodoform gauze, over which an antiseptic dressing was applied. One or two results were possible. Either the crushed parts might become eliminated by and by, and under favorable circumstances recovery might take place, or else, the bleeding having stopped and inflammatory thickening and adhesion having occurred, a nephrectomy might, later, be performed.

On February 3, urine was noticed to pass through the wound. The dressing was changed without bleeding, and a new one applied. On the same day the water commenced to clear up, although still containing considerable pus. He gradually improved, the large cavity contracted more and more, the urine became more and more normal, the crushed parts of the kidney came away by irrigation, and on March 16, he left the hospital with the wound healed, with the exception of a small fistula, through which scarcely anything was discharged. The fistula has since healed completely, and the patient is in excellent health.

I desire to add a few general remarks on the subject of crushed kidneys. In regard to the etiology of ruptured and crushed kidneys, blows, falls and crushes are mentioned as the most frequent causes, not considering the cases which are produced by gunshot wounds, etc. A quite frequent cause, probably the most frequent, are crushes between the bumpers of railroad cars. "In International Encyclopœdia of Surgery" two cases are mentioned. One was that of a man, æt. 21,

who was struck by the bumper of an engine. He vomited and complained of great pain beneath the ribs. Next day bloody urine was noted, which gradually increased, so that great tenesmus of the bladder occurred from coagula in the bladder. A dull swelling formed in the left side of the abdomen, tympanitis and delirium supervened, and death occurred on the twenty-sixth day. The left kidney was found ruptured across the middle, and the lower segment crosssed transversely by numerous fissures. A large cavity was found surrounding the broken kidney, filled with grumous, offensive blood, clots and urine. In the peritoneum, forming the anterior wall of this cavity, there was a ragged rent in a thin slough, through which offensive serum was found to exude into the peritoneal sac.

The other case died on the 11th day, a tumor having been observed on the left side, with similar symptoms as in the previous case. The left kidney was found completely divided through the pelvis and the two halves widely separated by blood and urine, which reached behind the peritoneum as high up as the diaphragm and as low down as the insertion of the proas muscle on the femur. A kidney may become completely torn through, either transversely or longitudinally, there may be several small surface-tears, or it may be pulpified, as in my case.

The first and principal danger is the bleeding, which gradually may reach such proportions that strangling of the peritoneum from pressure occurs. If a large branch of the renal artery is torn, death may occur quickly. If the patient survives this danger, he stands an excellent chance of succumbing to a perinephritic abscess. Can you imagine a better chance for the development of a genuine abscess than a crushed kidney with a collection of blood and urine in the loose, fatty and easily destroyed t ssue in the retroperitoneal space.

It is true that there are a number of recoveries from ruptured kidneys on record, the principal symptoms of which were homaturia, but, to say the least, it is questionable whether they were cases of ruptured kidney! Homaturia is not necessarily a symptom of ruptured kidney, occurring, as it does, from contusions, renal calculus, acute nephritis, etc.

On the other hand, a ruptured kidney may exist without hematuria, if the ureter becomes plugged by a clot or completely torn across, so that neither blood nor urine can reach the bladder. In regard to symptoms I can give no better description than that of Henry Morris, surgeon to the Middlesex Hospital in London.

"If after the abdomen has been run over or the person has fallen or

been struck on the abdomen or loin, faintness, coldness, vomiting and abdominal pains follow; if on the day of, or the day after the accident, and whether the catheter be required or not, the urine is found to contain a quantity of blood and bloodclot; and if after several days bloodclots continue to pass, or pus as well as blood is voided in the urine; if, moreover, there is pain along the course of the ureter, with retraction of the testis, or a rigid and prominent state of some of the muscles of one side of the abdomen, with frequent desire to micturate; or finally, if a tumor, dull on percussion, forms in the loin, or lumbar or hypochondriac region of the abdomen, accompanied or not with signs of local peritonitis—there are safe grounds for believing that either the kidney or its pelvis has been ruptured."

The prognosis, at best, is doubtful and the mortality great. Dr. Otis gives a statistic of 27 cases, of which 16 died; a mortality of 59%. Maas gives another of 71 cases, of which 34 died; a mortality of 48%. Both added together give 98 cases with 50 deaths; a mortality of 51%, all for subparietal injuries.

In compound injuries, by gun-shot wounds or penetrating instruments, the mortality is still greater. In the Medical and Surgical History of the War 78 such cases are mentioned, 52 of which died; a mortality of 67%. In none of these were operations performed.

When we, lastly, consider the treatment, then I believe that very little reliance can be placed in the usual administration of opium, ergot, astringents and cold applications, except in the lightest cases, which would probably recover without treatment. Considering that an exploratory incision of the kidney-region under antiseptic precautions is an operation absolutely devoid of danger, and that by no other means are we able to satisfy ourselves of the amount of injury done or prevent dangerous and fatal complications from occurring, I am strongly in favor, with Simon, of employing this method as a preliminary step in all cases in which there are serious symptoms of ruptured kidney. If we should find the diagnosis wrong or the injury less than we suspected, no harm will have been done; if right, we are in a position to judge about the severity of the lesion and the means to be used in order to meet the dangers, be this ligation of ruptured arteries, nephrectomy, if possible, in completely crushed organs, or simply, as in my case, removal of clots and blood, disinfecting of the cavity and packing with iodoform-gauze, leaving the wound open for drainage and referring the question of nephrectomy to a future time.

That even in such a case nature can accomplish wonders and that nephrectomy may be superfluous, is well shown in this case.